LISTING OF THE CLAIMS

1-37. (Canceled).

38. (Previously Presented) A method of forming a layer, of an insulating silicon compound, having a desired thickness for an integrated circuit, comprising:

performing multiple chemical vapor deposition cycles in a reaction chamber, each cycle comprising:

first, depositing a silicon layer on a substrate by exposing the substrate to a silicon source, wherein the silicon layer has a silicon layer thickness between about 3 Å and 25 Å, wherein depositing the silicon layer is performed under mass transport limited deposition conditions; and

second, reacting the silicon layer to partially form the layer of an insulating silicon compound, wherein trisilane is the silicon source used to deposit a first silicon layer on the substrate in a first performance of a cycle of the plurality of cycles, wherein the silicon-containing compound layer has a thickness non-uniformity of about 5% or less and a step coverage of about 80% or greater.

39. (Original) The method of Claim 38, wherein reacting comprises nitriding and wherein the insulating silicon compound is silicon nitride.

40. (Original) The method of Claim 39, wherein the layer of an insulating silicon compound has a stoichiometry of about 43 silicon atoms per 56 nitrogen atoms.

41. (Original) The method of Claim 38, wherein reacting comprises oxidizing and wherein the insulating silicon compound is silicon oxide.

42. (Cancelled).

43. (Original) The method of Claim 42, wherein the silicon source for depositing subsequent silicon layers after depositing the first silicon layer comprises a silicon compound selected from the group consisting of silanes having a silane chemical formula Si_nH_{2n+2}, where n = 1 to 4, and halosilanes having a halosilane chemical formula $R_{4-X}SiH_X$, where R = Cl, Br or I and X = 0 to 3.

44. (Original) The method of Claim 43, wherein all silicon layers deposited after the first silicon layer are formed with the same silicon source.

45. (Previously Presented) The method of Claim 105, wherein a first substrate temperature for depositing the first silicon layer is less than about 525°C.

46. (Original) The method of Claim 45, wherein the first substrate temperature is less than about 475°C.

47. (Original) The method of Claim 46, wherein a second substrate temperature for reacting the first silicon layer is greater than the first substrate temperature.

48. (Original) The method of Claim 47, wherein depositing and reacting are performed isothermally after reacting the first silicon layer.

49. (Original) The method of Claim 48, wherein a third substrate temperature for depositing and reacting, after reacting the first silicon layer, is between about 400°C and 650°C.

50. (Original) The method of Claim 49, wherein the third substrate temperature is greater than about 525°C.

51. (Original) The method of Claim 47, further comprising evacuating the reaction chamber for at least about 10 seconds before reacting the first silicon layer.

52. (Original) The method of Claim 47, wherein the first silicon layer has a first silicon layer thickness of about 8-12 Å.

53. (Original) The method of Claim 52, wherein a temperature and a duration for reacting are chosen to prevent reacting the substrate under the silicon layer.

54. (Original) The method of Claim 52, wherein reacting the silicon layer comprises exposing the silicon layer to an atomic species.

55. (Original) The method of Claim 54, wherein the atomic species is atomic nitrogen.

56. (Original) The method of Claim 38, wherein the reaction chamber is a single substrate laminar flow reaction chamber.

57-104. (Cancelled).

105. (Previously Presented) The method of Claim 38, wherein a temperature for reacting is less than about 650°C.

106. (Previously Presented) The method of Claim 38, wherein a thickness of the first silicon layer on the substrate is about greater than or equal to a nitridation saturation depth.